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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,977

12/11/2003

Lionel C. Kimerling

MIT.10086

1313

7590

10/13/2004

Matthew E. Connors
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EXAMINER

DUPUIS, DEREK L

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 10/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/733,977

Applicant(s)

KIMERLING ET AL.

Examiner

Derek L Dupuis

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-16 is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/11/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/9/04 & 12/11/03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-16 are allowed.
2. The following is an examiner's statement of reasons for allowance: Claims 1-16 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious a waveguide-semiconductor device comprising a waveguide structure with a multimode interferometer structure that minimizes the reflections of TE modes and a mesa structure that is coupled to the waveguide structure that minimizes the reflections of TM modes in combination with the rest of the claimed limitations.
3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Hamamoto (US 2001/0021299 A1)* teaches a semiconductor waveguide photodetector that strongly confines the TE and TM modes. However, Hamamoto does not teach that these modes are confined by a multimode interferometer structure or a mesa structure. *Yang (US 6,778,723 B1)* teaches an integrated optical switch with a mesa structure and optical detector comprising germanium. However, Yang does not teach that detector and the mesa structure are separate components of the invention as claimed by the applicant.
5. This application is in condition for allowance except for the following formal matters:

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6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "20" and "22" have both been used to designate the coupling device. Reference characters "20" and "26" have both been used to designate the Si layer.
7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "16" has been used to designate both the upper cladding and the lower cladding in line 13 of page 5. Reference character "22" has also been used to designate both the SiNx waveguide and the coupling device. Reference character "20" has also been used to designate both the Si layer and the coupling device.
8. The drawings are objected to because figures 2A, 2B, 5A, and 5B are too dark to properly discern the features of the drawings.
9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 2 and 20.
10. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the multimode interferometer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
11. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

12. The disclosure is objected to because of the following informalities: the phrase "would be an inefficient to be used in" in line 22 of page 2 should apparently read "would be inefficient in". The word "improve" in line 11 of page 4 should apparently be "improved". The phrase "growth facets" in line 21 of page 5 should apparently be "growth facets of". The phrase "growth facet" in line 22 of page 5 should apparently be "a growth facet of". The phrase "will address this issue more issue hereinafter" in line 7 of page 6 should apparently be "will address this issue more hereinafter". The phrase "the detector is also formed on the Si layer 26" in line 14 of page 7 should apparently be "the detector 26 is also formed on the Si layer 28". The phrase "coupling 20" in line 22 of page 7 should apparently be "coupling device 20".

13. The informalities above are given as examples as there are too many informalities in the application to list in this office action. The applicant is advised to review the specification and the drawings and make additional corrections as needed. The applicant is advised to pay specific attention to the use of reference numbers throughout the specification with regards to the objections to the drawings noted above. Appropriate correction is required.

14. Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

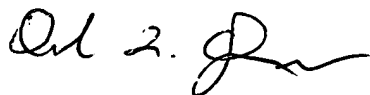
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A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Derek L. Dupuis
Examiner
Group Art Unit 2883



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800